AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Please cancel claims 1 to 33.

34. (New) A method of determining the effective concentration of divalent cations in a fabricated electrolyte, the method comprising:-
    (i) determining the concentration of divalent cations in a fabricated electrolyte;
    (ii) determining the concentration of trivalent cations in a fabricated electrolyte; and
    (iii) subtracting the adjusted concentration of trivalent cations from the concentration of divalent cations to produce the effective concentration of divalent cations.

35. (New) A method as defined in claim 34, wherein the concentration of divalent cations in a fabricated electrolyte is determined by adding the concentration of divalent cations that were added to the electrolyte prior to completion of a fabrication process to the concentration of divalent cations determined to be in the electrolyte after the fabrication process, had there been no additions.

36. (New) A method as defined in claim 34, wherein at least some of the divalent cations are produced in the electrolyte by converting or reducing trivalent cations into divalent cations.

37. (New) A method as defined in claim 35, wherein at least some of the divalent cations are produced in the electrolyte by converting or reducing trivalent cations into divalent cations.

38. (New) A method as defined in claim 36, wherein trivalent cations are converted or reduced into divalent cations during the fabrication process.

39. (New) A method as defined in claim 36, wherein trivalent cations are converted or reduced into divalent cations during the fabrication process by appropriate control of an oxygen or water partial pressure in a sintering furnace.

40. (New) A method as defined in claim 34, wherein divalent cations are added to the electrolyte prior to completion of the fabrication process.

41. (New) A method as defined in claim 34, wherein at least some of the divalent cations in the electrolyte originate from vapours produced from a metal substrate or an oxide layer on a metal substrate.

42. (New) A method as defined in claim 34, wherein the concentration of cations is controlled such that the effective concentration of divalent cations is arranged to be between 0.01 mole % and 0.1 mole % inclusive.

43. (New) A method as defined in claim 42, wherein the effective concentration of divalent cations is arranged to be between 0.02 mole % and 0.09 mole % inclusive.

44. (New) A method as defined in claim 43, wherein the effective concentration of divalent cations is arranged to be between 0.03 mole % and 0.08 mole % inclusive.

45. (New) A method as defined in claim 34, wherein the determined concentration of trivalent cations is adjusted by multiplication typically by a factor between 5 and 10.

46. (New) A method of preparing a ceria based electrolyte with a density greater than 97% of the theoretical achievable density, the method comprising:-

(i) providing a ceria based electrolyte; and

(ii) sintering the electrolyte at a temperature up to 1200°C such that the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.01 mole % and 0.1 mole %.

47. (New) A method as defined in claim 46, wherein the conditions of the sintering process are controlled to reduce at least some trivalent cations in the electrolyte into divalent cations.

48. (New) A method as defined in claim 47, wherein the conditions of the sintering process are controlled to produce a suitable oxygen or water pressure to reduce a suitable amount of trivalent cations into divalent cations.

49. (New) A method as defined in claim 46, wherein the electrolyte is provided on a substrate and wherein the substrate material is selected to produce the required concentration of divalent cations minus the adjusted concentration of trivalent cations in the electrolyte.

50. (New) A method as defined in claim 49, wherein the electrolyte is provided on a substrate and the substrate material is selected to produce the required concentration of divalent cations minus the adjusted concentration of trivalent cations in the electrolyte and wherein an electrode is provided between the electrolyte and the substrate.

51. (New) A method as defined in claim 46, wherein divalent cations are added to the electrolyte before or during the sintering process.

52. (New) A method as defined in claim 46, wherein the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.02 mole % and 0.09 mole % inclusive.

53. (New) A method as defined in claim 52, wherein the concentration of divalent cations minus the adjusted concentration of trivalent cations in the sintered electrolyte is between 0.03 mole % and 0.08 mole % inclusive.

54. (New) A method as defined in claim 46, wherein the concentration of trivalent cations is adjusted by multiplication by a number between 5 and 10.

55. (New) A method as defined in claim 46, wherein the electrolyte is sintered at a temperature up to 1100°C.

56. (New) A method as defined in claim 55 wherein the electrolyte is sintered at a temperature up to 1050°C.

57. (New) A method as defined in claim 56, wherein the electrolyte is sintered at a temperature up to 1000°c.

58. (New) A method as defined in claim 46, wherein the electrolyte is provided as a thick film.

59. (New) A ceria based electrolyte with a density greater than 97% of the theoretical achievable density and with a concentration of divalent cations minus an adjusted concentration of trivalent cations of between 0.02 mole % and 0.1 mole % inclusive.

60. (New) An electrolyte as defined in claim 59, wherein the concentration of divalent cations minus an adjusted concentration of trivalent cations is between 0.02 mole % and 0.09 mole % inclusive.

61. (New) An electrolyte as defined in claim 60, wherein the concentration of divalent cations minus an adjusted concentration of trivalent cations is between 0.03 mole % and 0.08 mole % inclusive.

62. (New) An electrolyte as defined in claim 59, wherein the concentration of trivalent cations is adjusted by multiplication by a number between 5 and 10.

63. (New) An electrolyte as defined in claim 59, wherein the electrolyte is provided as a thick film

64. (New) A half cell assembly comprising a substrate, an electrode and an electrolyte as defined in claim 59.

65. (New) A half cell assembly comprising a substrate, an electrode and an electrolyte as defined in claim 60.

66. (New) A half cell assembly comprising a substrate, an electrode and an electrolyte as defined in claim 61.

67. (New) A half cell assembly comprising a substrate, an electrode and an electrolyte as defined in claim 62.

68. (New) A half cell assembly comprising a substrate, an electrode and an electrolyte as defined in claim 63.

69. (New) A fuel cell assembly comprising a half cell as defined in claim 64 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

70. (New) A fuel cell assembly comprising a half cell as defined in claim 65 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

71. (New) A fuel cell assembly comprising a half cell as defined in claim 66 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

72. (New) A fuel cell assembly comprising a half cell as defined in claim 67 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

73. (New) A fuel cell assembly comprising a half cell as defined in claim 68 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

74. (New) A fuel cell as defined in claim 69, wherein the first electrode is an anode and the further electrode is a cathode.

75. (New) A fuel cell as defined in claim 70, wherein the first electrode is an anode and the further electrode is a cathode.

76. (New) A fuel cell as defined in claim 71, wherein the first electrode is an anode and the further electrode is a cathode.

77. (New) A fuel cell as defined in claim 72, wherein the first electrode is an anode and the further electrode is a cathode.

78. (New) A fuel cell as defined in claim 73, wherein the first electrode is an anode and the further electrode is a cathode.

79. (New) An oxygen generator, comprising a half cell assembly as defined in claim 64 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

80. (New) An oxygen generator, comprising a half cell assembly as defined in claim 65 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

81. (New) An oxygen generator, comprising a half cell assembly as defined in claim 66 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

82. (New) An oxygen generator, comprising a half cell assembly as defined in claim 67 and a further electrode provided on the opposite side of the electrolyte from the first electrode.

83. (New) An oxygen generator, comprising a half cell assembly as defined in claim 68 and a further electrode provided on the opposite side of the electrolyte from the first electrode.